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ABSTRACT

Many academic examinations exhibit sex differences in terms of entry figures and pass rates. This fact is illustrated by a selection of statistics from the British GCE "O" level examination results for June 1976. These results are discussed in terms of three possible causes: innate differences in intellectual functioning, sex role stereotyping, and sex bias in the examinations themselves. The research evidence concerning sex differences in intellectual functioning seems inconclusive, and certainly does not seem to indicate any large and consistent differences. Where differences do exist it is also impossible to assume that they are innate, as the influence of socially defined sex role stereotyping is apparent. The link between sex role stereotyping and sex differences in attitudes to various academic subjects also seems to be a distinct possibility. In addition to this, the evidence for the effect of attitude on performance makes the sex role stereotyping explanation for these results a most realistic one. The possibility of sex bias in the examinations themselves was not completely ruled out but, like the innate differences hypothesis, this did not seem to be a tenable explanation for the overall size of the differences. (Author)

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SEX DIFFERENCES IN EXAMINATION PERFORMANCE:

DO THESE REFLECT DIFFERENCES IN ABILITY OR SEX-ROLE STEREOTYPES?

by

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ABSTRACT

Many academic examinations exhibit sex differences in terms of entry figures and pass rates. This fact is illustrated by a selection of statistics from the British GCE 'O' level examination results for June 1976. These results are discussed in terms of three possible causes: innate differences in intellectual functioning, sex-role stereotyping, or sex-bias in the examinations themselves.

The research evidence concerning sex differences in intellectual functioning seems inconclusive, and certainly doesn't seem to indicate any large and consistent differences. Where differences do exist it is also impossible to assume that they are innate, as the influence of socially defined sex-role stereotyping is apparent. The link between sex-role stereotyping and sex differences in attitudes to various academic subjects also seems to be a distinct possibility. In addition to this, the evidence for the effect of attitude on performance makes the sex-role stereotyping explanation for these results a most realistic one. The possibility of sex-bias in the examinations themselves was not completely ruled out but, like the innate differences hypothesis, this did not seem to be a tenable explanation for the overall size of the differences.

INTRODUCTION

The well known phenomenon that, within the years of secondary education, girls tend to prefer arts subjects and boys tend to prefer science subjects, is reflected in the GCE examination statistics. Table One gives a breakdown of the cumulative figures for all the GCE Boards, comparing the number of entries from and performance of male and female candidates in a selection of the major 'O' Level subjects in the June 1976 examinations.

TABLE ONE

COMPARISON OF MALE AND FEMALE ENTRIES AND PASS RATES IN VARIOUS GCE 'O' LEVEL EXAMINATIONS IN JUNE 1976 (ALL BOARDS)

Subject	Sex	Entry	% Pass (ABC Grades)	
ENGLISH LITERATURE	FEMALES	141 000	64	Higher female entry & pass rate.
	MALES	106 000	54	
ENGLISH LANGUAGE	FEMALES	203 000	65	"
	MALES	183 000	56	
FRENCH	FEMALES	84 000	64	"
	MALES	66 000	58	
RELIGIOUS STUDIES	FEMALES	40 000	63	"
	MALES	25 000	51	
CHEMISTRY	FEMALES	30 000	60	Higher male entry & pass rate.
	MALES	60 000	61	
PHYSICS	FEMALES	25 000	58	"
	MALES	86 000	59	
MATHEMATICS	FEMALES	87 000	56	"
	MALES	116 000	60	
BIOLOGY	FEMALES	86 000	56	Higher female entry. Higher male pass rate.
	MALES	61 000	61	

Apart from Biology which, as far as sex differences are concerned, always appears to be the odd one out of the sciences (Ormerod, 1975) these 'O' Level subjects show the conventional sex differentiated trends both in terms of the relative number of males and females entering each subject and in terms of their pass rates. It is also noticeable that this difference in pass rates is greater in the female dominated subjects than it is in the male dominated subjects, and this may to some extent reflect the general tendency for better all-round female attainment at this level of education (Monday et Al, 1967).

In this paper we propose to investigate further these sex differences in both subject choice and performance on examinations in different subjects. We will investigate these differences from a number of different angles, and in particular we will discuss whether they can be considered to be the result of differences in ability between the sexes or whether they are more a function of sex-role stereotyping.

SEX DIFFERENCES IN INTELLECTUAL FUNCTIONING

There are areas of intellectual functioning which have traditionally been thought of as displaying consistent differences between the sexes, and there is a possible link up between these and the differences in examination performance. These proposed sex differences in ability include verbal ability, mathematical ability and visual-spatial ability. Certainly these skills have been observed to differ between the two sexes, although the extent of the differences and their dependence on the type of test used is far from being clear cut. Maccoby and Jacklin (1975) have provided an extensive analysis of the evidence in a review in which they consider over 1400 research studies published since 1965. The fact that Maccoby and Jacklin's book has

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been criticised by Fairweather (1976) both for the conclusions drawn and for the fact that it missed out so much important work, only emphasizes the great uncertainty that exists when one attempts to draw general conclusions from the research done in this area.

Another point to bear in mind when considering studies which purport to demonstrate sex differences in intellectual abilities is one made by Saraga (1975) and Dwyer (1976), who go to great lengths to emphasize the need to realise the amount of overlap that exists when studies of intellectual functioning do show significant differences between the average scores of males and females. These authors also point out that there is normally more variation in these skills within groups of males or females than there ever is between them.

When one considers what the cause of these differences might be, there is still the question to be asked as to whether they are the result of some innate biologically determined sex differences or whether they are the result of the influence of culturally defined sex-role stereotypes. Glickman (1976) after considering several possible physiological theories, such as different rates of development of males and females, brain lateralization, and the influence of sex hormones, concludes that cultural reinforcement is the most realistic reason for these sex differences in intellectual functioning. However, Hutt (1974) argues strongly that these social cultural expectations must have come from somewhere, and she argues that they must at least be based on some basic inherent differences between the sexes.

The question as to how stereotypes of sex differences in intellectual functioning arise is also raised by Bee (1974) and is clearly a central issue in this debate. The influence

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of cultural expectations on the performance of individuals is hard to discount, but it is still a possibility that these expectations are, in turn, amplifying innate differences which originally accounted for the occurence of these cultural expectations.

Clearly, within the literature on sex differences in intellectual abilities, there is still much uncertainty. The differences which have been suggested could have some effect on examination performance in different subjects although, as has been pointed out by Kelly (1975), Saraga (1975) and others, there are considerable problems in attempting to relate specific intellectual abilities to achievement in specific subject areas. Also, it must be remembered that sex differences in intellectual abilities can just as easily be the result of sex-role stereotyping as can sex differences in examination performance, and they therefore cannot be assumed to reflect inherent biological differences between the sexes even if these do exist.

One must therefore reject any simple theory of innate sex differences in ability which might be used to account for sex differences in examination performance. The evidence for such a theory is extremely weak and, as in so many areas of psychology, it is a virtual impossibility to separate out completely the innate from the acquired.

SEX DIFFERENCES IN ATTITUDES TOWARDS EXAMINATIONS IN DIFFERENT SUBJECTS

There would seem to be considerable consistency in studies reporting parallel sex differences in both attitudes and achievement in those subjects, which are traditionally thought of as being more appropriate to one sex or the other (Ormerod, 1971, 1975, Hilton and Berglund, 1974, and Gardner, 1975).

Hilton and Berglund's study is a particularly interesting one, in that it showed that before Grade 5 in some American schools, there was no difference in the Mathematics achievement scores of boys and girls, nor was there any real difference in their attitude towards Mathematics. However, from that stage on the boys moved steadily ahead of the girls both in terms of their attitude towards the subject and in terms of their achievement in it. Here again is the difficult problem of determining causation, but Hilton and Berglund concluded that it was most likely from their evidence that sex role stereotyping was producing the difference in attitude and it was this that was, in turn, causing the difference in achievement.

Carey (1955) provides some positive evidence for the idea that low attitude towards a task can, in itself, produce low achievement. She was working with certain problem solving tasks, in a situation where higher male achievement appeared to be related to more positive attitudes towards these problems. She found that group discussions which were designed to produce more favourable attitudes towards these problems, significantly improved female performance on them but not male performance. This result suggests that, in this case, the females were not doing as well as they might have been on the task because of their poor attitude and that this situation could be changed by improving their attitude.

If this effect of attitudes on achievement is a general one, it is easy to see how sex-role stereotypes could produce sex differences in attitudes towards different school subjects. These sex-role oriented attitudes could, then, easily produce sex differences in examination performance in these subjects.

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A further piece of evidence which tends to support the view that different attitudes to subjects are produced by social culture influences rather than inherent differences in ability, is the work of Keeves (1973). Keeves did a cross-cultural study of sex differences in attitude and attainment in different subjects. He showed that these sex differences varied considerably between different cultures, to the extent that he concluded that the main cause of them was most likely to be found within the influence of the individual cultures.

Thus, it could be proposed that each culture has its own sex-role stereotypes, which provide expectations of educational interest and success in different subjects. These ascribe different educational roles to males and females, who in turn reflect their conformity to these stereotypes through their attitudes and their examination performances in the different subjects.

CAN THE EXAMINATION CAUSE THE DIFFERENCE?

People who set examinations can hardly be held responsible for sex differences in the ability of candidates, or indeed for the attitude that candidates of either sex have to the examination. It is, however, possible that an examination can be set which contains a bias towards one sex or the other.

For instance, Graf and Riddell (1972) have shown that the same problem set in two different contexts can produce quite different sex differences in performance. They set the same mathematical problem in contexts appropriate to both a female role and a male role. In one case a woman was buying lace and satin in a fabric store, and in the

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other case a stock broker was charging different rates of commission for buying and selling stocks for his clients. Mathematically the problem to be solved in both cases was identical, but between two controlled groups of subjects there was a marked disparity between the performance of males and females when the problem was set in the stock broker context. This result indicated that the females found the problem much harder when it was set in the stock broker context, and this was confirmed by comparing the 'perceived difficulty ratings' (measured on a Likert-type scale) of the groups of subjects.

The extent to which sex-bias can be built into educational tests does not depend solely on problem context. Dwyer (1976) showed how a test of mathematical ability (the S.A.T. - M) became biased towards relatively better male performance by the inclusion of more geometry problems (requiring spatial ability) than algebra problems.

Another example of the way in which an examination may be sex-biased is when a different form of assessment is used. It has frequently been observed, for instance, that when objective tests are introduced in place of other forms of examination, this tends to produce relatively better male performance. Whether this is because this type of test does not test verbal ability in the way that other examinations do, or whether it is because objective tests are partly a test of the ability to break set or convergent thinking is not clear. Another possibility is that the attitude of females to objective tests is low, and this may be because they are perceived as a masculine type of activity.

On the whole, then, it wouldn't seem as though examinations themselves very often will be the cause of very large sex differences in performance, although an element of sex-bias

is a possibility. Efforts are taken to ensure that examinations are set so as to be fair tests for both males and females but, as we have said previously, examiners cannot be held responsible for the powerful effect that sex-role stereotyping may have in producing sex differences in examination performance.

CONCLUSIONS

Overall, it would seem to be fairly clear that sex-role stereotyping has a considerable influence within education, and in turn affects the performance of candidates of both sexes in examinations. The extent to which these stereotypes are built on actual differences in ability and the extent to which they are created by society remains unresolved, although it seems likely that the social cultural influence plays the bigger part.

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